

# PATENT ABSTRACTS OF JAPAN

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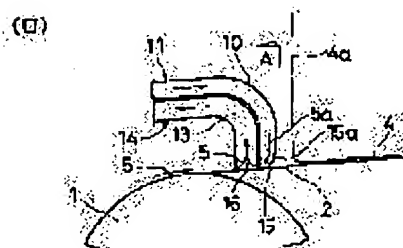
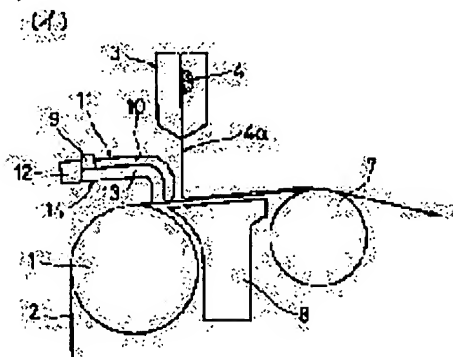
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## (54) AIR-SHUTTERING DEVICE FOR CURTAIN COATER



(57)Abstract:

PROBLEM TO BE SOLVED: To prevent the turbulence of a curtain profile by protecting a curtain of coating color from air to be drawn and carried by a base paper.

SOLUTION: In the curtain coater for applying the coating color 4 flowing down as a curtain 4a from a liquid feed head 3 on the surface of the base paper 2 wound by a coater roll 1 and travelling, an air blowing machine 11 and an air sucking machine 14 are arranged in the upstream side of a coating color flow down portion to be along the width direction of the curtain 4a. An air blowing port 15 of an air blowing nozzle 10 provided in the air blowing machine 11 is led before the coating color flow down position and arranged to closely approach the base paper 1 in a non-contact state. An air sucking port 16 of an air sucking nozzle 13 provided in the air sucking machine 14 is positioned to be adjacent to the

upstream side of the air blowing port 15 of the air blowing nozzle 10 and arranged to closely approach the base paper 2 in a non-contact state.

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## CLAIMS

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[Claim(s)]

[Claim 1] In the upstream location of the flowing-down location on the front face of stencil paper of the color for coating from the above-mentioned liquid supply head in the curtain coater makes the front face of the stencil paper it runs by being wound around a coater roll flow down in the shape of a curtain, and it is made to make the color for coating have applied to it from the liquid supply head The Ayr spraying nozzle which lengthened the Ayr outlet according to the curtain cross direction of the color for coating, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach a stencil paper front face, and it is made to fix to a non-contact condition. Air-cut equipment of the curtain coater characterized by enabling it to draw in from the Ayr inlet port of an Ayr suction nozzle with Ayr which accompanied Ayr sprayed on the stencil paper front face from the Ayr outlet of an Ayr spraying nozzle to stencil paper.

[Claim 2] On the front face of the applicator roll in the curtain coater made to apply to a stencil paper front face, the color for coating down which it was made to flow in the shape of a curtain on the surface of an applicator roll Make it flow down in the shape of a curtain, and it is made to make the color for coating apply from a liquid supply head. The Ayr spraying nozzle which lengthened the Ayr outlet in the upstream location of the flowing-down location of the color for coating down which it flows on an applicator roll front face according to the curtain cross direction of the color for coating from this liquid supply head, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach on the surface of an applicator roll, and it is made to fix to a non-contact condition. Air-cut equipment of the curtain coater characterized by enabling it to attract Ayr sprayed on the applicator roll front face from the Ayr outlet of an Ayr spraying nozzle from the Ayr inlet port of an

Ayr suction nozzle with Ayr which had the front face of an applicator roll accompanied.  
[Claim 3] Air-cut equipment of the curtain coater according to claim 1 or 2 made it Ayr which the downstream side edge of the Ayr outlet of an Ayr spraying nozzle is made crooked to the upstream, and blows off made to carry out turning to the upstream.

[Claim 4] Air-cut equipment of the curtain coater according to claim 1 or 2 which made the upstream side edge of the Ayr outlet of an Ayr spraying nozzle, and the downstream side edge of the Ayr inlet port of an Ayr suction nozzle shorter than the downstream side edge of the Ayr outlet, and the upstream side edge of Ayr inlet port, and made large the free passage section of the Ayr outlet and Ayr inlet port.

[Claim 5] Air-cut equipment of the curtain coater according to claim 1 or 2 which made the Ayr outlet of an Ayr spraying nozzle, and the Ayr inlet port of an Ayr suction nozzle slanting facing down so that the upstream might be turned to.

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#### DETAILED DESCRIPTION

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[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the air-cut equipment of the curtain coater which applies the color for coating to the stencil paper manufactured in the paper mill.

[0002]

[Description of the Prior Art] Let paper manufactured in the paper mill be a converted paper as a product which suits the necessary purpose in many cases by not being immediately used in a form as it is, and processing it further by making it into stencil paper. Although there are various things in a converted paper, an application converted paper is in one of them. An application converted paper makes the color for coating (coating liquid) apply on the surface of paper, and is manufactured, and curtain coater is known as one of the equipment of the.

[0003] Curtain coater is wound around the coater roll 1, and it is made to make this color 4 for coating have applied directly on stencil paper 2 by making the front face of the stencil paper 2 it runs upward a little towards a lower stream of a river from this coater roll 1 flow down the color 4 for coating as coating liquid as uniform curtain 4a by the liquid supply head 3, as the outline of the example is shown in drawing 8.

[0004] Since curtain 4a of the color 4 for coating is thin, it shakes, even if few wind pressures act, and a profile is confused, a coating side gets worse, and it makes product quality deteriorate in the above-mentioned curtain coater. On the other hand, although accelerated, spreading of the color 4 for coating to stencil paper 2 front face by the above-mentioned curtain coater in recent years If run [ come ] at a high speed at which stencil paper 2 exceeds 600 m/min The wind pressure of Ayr 5 of the stencil paper (made to go together) surface layer which is lengthened by transit of this stencil paper 2 and carried sways curtain 4a of the above-mentioned color 4 for coating, and the problem of having a bad influence on a coating side comes to arise. From this, conventionally The upstream location of curtain 4a of the color 4 for coating, Above the stencil paper 2 in the upstream location of the liquid supply head 3, namely, the scraper-like blade 6 for air cuts Make it incline, and contact the front end (lower limit) on the front face of stencil paper 2, and it is arranged so that it may become facing down towards the transit direction of stencil paper 2. Ayr 5 of the stencil paper surface layer which transit of stencil paper 2 lengthens and you are made to accompany He is trying to prevent that intercept as it

scratches from stencil paper 2 front face with a blade 6 in the upstream location of the flowing-down location of the color 4 for coating and drops, and the curtain profile of the color 4 for coating is disturbed by the wind pressure of above-mentioned Ayr 5 by which company is carried out.

[0005] In addition, the guide roll which allotted 7 to the downstream of the flowing-down location of the color 4 for coating, and 8 show the color pan for collecting the colors 4 for coating which flowed down from \*\*\*\* of stencil paper 2 at the time of coating.

[0006]

[Problem(s) to be Solved by the Invention] however, by the above-mentioned conventional air-cut method Since it is what the tip of a blade 6 is contacted on the front face of stencil paper 2, and scratches Ayr 5 of the front face of stencil paper 2, In order that the paper powder which paper powder generated by friction with the stencil paper 2 and the blade 6 which carry out high-speed transit, and this paper powder deposited on the part of a blade 6, and was deposited on the part of a blade 6 may sometimes fall on stencil paper 2, the problem that a defect arises is in a product. Moreover, since a blade 6 is worn out, periodical exchange is needed.

[0007] Then, without generating paper powder, this invention tends to cut Ayr accompanied to stencil paper or a roll just before the color flowing-down location for coating, and tends to offer the air-cut equipment of curtain coater which can prevent turbulence of the curtain profile of the color for coating.

[0008]

[Means for Solving the Problem] In order that this invention may solve the above-mentioned technical problem, on the front face of the stencil paper it runs by being wound around a coater roll In the upstream location of the flowing-down location on the front face of stencil paper of the color for coating from the above-mentioned liquid supply head in the curtain coater to which make it flow down in the shape of a curtain, and make it make the color for coating have applied from the liquid supply head The Ayr spraying nozzle which lengthened the Ayr outlet according to the curtain cross direction of the color for coating, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach a stencil paper front face, and it is made to fix to a non-contact condition. Consider as the configuration it enabled it to attract from the Ayr inlet port of an Ayr suction nozzle with Ayr which accompanied Ayr sprayed on the stencil paper front face from the Ayr outlet of an Ayr spraying nozzle to stencil paper, or On the front face of the applicator roll in the curtain coater made to apply to a stencil paper front face, the color for coating down which it was made to flow in the shape of a curtain on the surface of an applicator roll Make it flow down in the shape of a curtain, and it is made to make the color for coating apply from a liquid supply head. The Ayr spraying nozzle which lengthened the Ayr outlet in the upstream location of the flowing-down location of the color for coating down which it flows on an applicator roll front face according to the curtain cross direction of the color for coating from this liquid supply head, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as

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[0009] If Ayr carried with transit of stencil paper or rotation of an applicator roll reaches just before the color flowing-down location for coating, since it will be cut by Ayr sprayed through an Ayr spraying nozzle and will be drawn in through an Ayr suction nozzle with this blasting \*\*\*\* Ayr, this Ayr can prevent giving turbulence to the curtain profile of the color for coating.

[0010] Moreover, cut Ayr can be made to attract more effectively [ an Ayr suction nozzle ] than Ayr inlet port by making the downstream side edge of the Ayr outlet of an Ayr spraying nozzle crooked to the upstream, and considering as the configuration made it Ayr blowing off made to carry out turning to the upstream.

[0011] Furthermore, the upstream side edge of the Ayr outlet of an Ayr spraying nozzle and the downstream side edge of the Ayr inlet port of an Ayr suction nozzle are made shorter than the downstream side edge of the Ayr outlet, and the upstream side edge of Ayr inlet port. Into an Ayr suction nozzle, it is [ Ayr sprayed through an Ayr spraying nozzle ] surroundings-lump-easy, it can be carried out, and it can be made to draw in effectively by considering as the configuration which made large the free passage section of the Ayr outlet and Ayr inlet port.

[0012] Furthermore, by considering the Ayr outlet of an Ayr spraying nozzle, and the Ayr inlet port of an Ayr suction nozzle as the configuration which considered as slanting facing down so that the upstream might be turned to, from a transverse plane, it can put back to the upstream directly, and Ayr where it went together can be cut effectively, and can be attracted again.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

[0014] Similarly drawing 1 (b) (b) with one gestalt of operation of this invention being shown and an example having been shown in drawing 8 In the curtain coater to which make it make the color 4 for coating down which the front face of the stencil paper 2 it runs by being wound around the coater roll 1 was made to flow in the shape of curtain 4a from the liquid supply head 3 have applied The Ayr machine of shotcrete 11 which becomes the duct 9 for Ayr spraying and this duct 9 for Ayr spraying which were connected to the Ayr source of supply which is not illustrated above the stencil paper 2 of the upstream rather than the flowing-down location of the above-mentioned color 4 for coating from the Ayr spraying nozzle 10 of the shape of a flat box which made free passage connection, The Ayr suction machine 14 which becomes the duct 12 for Ayr suction and this duct 12 for Ayr suction which were connected to the source of Ayr suction which is not illustrated from the Ayr suction nozzle 13 of the shape of a flat box by which free passage connection was made is installed. It is made to attract Ayr 5 where Ayr 5a sprayed on the front face of stencil paper 2 from the Ayr spraying nozzle 10 was accompanied to stencil paper 2 from the Ayr suction nozzle 13.

[0015] If it explains in full detail, the above-mentioned Ayr spraying nozzle 10 will form the Ayr outlet 15 at a tip for a long time in the shape of a slit according to the cross direction of curtain 4a. While arranging so that this Ayr outlet 15 may be turned to the front face of stencil paper 2 in the direction of a right angle, few clearances may be held on the front face of this stencil paper 2 and it may become non-contact. The Ayr suction nozzle 13 is arranged in the upstream of this Ayr spraying nozzle 10 as the Ayr inlet port 16 at a tip touches the Ayr outlet 15 of the above-mentioned Ayr spraying nozzle 10 at least. While making Ayr inlet port 16 consistent crosswise [ of curtain 4a ] in parallel with the Ayr outlet 15 and forming in the shape of a slit. It changes into a non-contact condition towards the direction of a right angle on the front face of stencil paper 2. And the downstream wall of the above-mentioned Ayr spraying nozzle 10. It is made to be in the location of less than 30mm of upstream of curtain 4a, Ayr 5 just before reaching curtain 4a is cut by Ayr 5a sprayed from the Ayr spraying nozzle 10, and it is made to make the Ayr suction nozzle 13 draw in.

[0016] When adjustment to multistage was enabled so that the Ayr suction force of the above-mentioned Ayr suction nozzle 13 might have the capacity to attract Ayr 5a sprayed from the Ayr spraying nozzle 10 and it could respond to change of the amount of Ayr by the travel speed of stencil paper 2, for example, the amount of suction is set to  $Q_1$  and the amount of spraying is set to  $Q_2$ , it is made to have used as about  $Q_1 \geq 1.5Q_2$ .

[0017] Moreover, although the structure which is open for free passage in the whole paper width direction is sufficient as the above-mentioned Ayr spraying nozzle 10, as an example is shown in drawing 2, it is good also as structure where the interior is divided into the paper width direction necessary spacing by dashboard 10a for distribution. It was made to be prolonged from the duct 9 for Ayr spraying to the location before the Ayr outlet 15.

[0018] Ayr 5 of the stencil paper surface layer lengthened and carried by the stencil paper 2. It runs at the time of operation of curtain coater. If the flowing-down location of the color 4 for coating tends to be approached and it is going to pass through the location of the Ayr outlet 15 of the Ayr spraying nozzle 10, and the Ayr inlet port 16 of the Ayr suction nozzle 13. The layer of Ayr 5 by which company was carried out [ above-mentioned ] will be broken from the duct 9 for Ayr spraying by Ayr 5a sprayed from the Ayr outlet 15 through the Ayr spraying nozzle 10. An air cut will be carried out and cut. So-called Ayr 5 will be further attracted through the Ayr suction nozzle 13 by the duct 12 for Ayr suction with sprayed Ayr 5a. Therefore, the wind of Ayr 5 where it went together can prevent turbulence of a curtain profile in curtain 4a of the color 4 for coating.

[0019] Ayr 5 cut since turning was carried out so that Ayr which will be sprayed from Ayr outlet 15 of this Ayr spraying nozzle 10 if it is made configuration which, as for Ayr outlet 15 which faces curtain side of Ayr spraying nozzle 10 in the above, downstream side edge 15a covers overall length to the upstream, and inclines 5a might turn to the upstream can be made to attract more effectively [ the Ayr suction nozzle 13 ] than Ayr inlet port 16. Company of new Ayr which is the downstream of the Ayr outlet 15 of the Ayr spraying nozzle 10, and gives turbulence to a curtain profile seems moreover, not to generate it, since the Ayr outlet 15 of the Ayr spraying nozzle 10 is arranged in the location of less than 30mm of near sides of the spreading location used as the location down which curtain 4a of the color 4 for coating flows.

[0020] Thus, since it is made to make Ayr 5 where it went together while spraying Ayr 5a

attract, stencil paper 2 sticks fast, there is no \*\*, and since Ayr 5 where it goes together can be cut by the non-contact method, paper powder is not generated at the time of an air cut, and articles of consumption, such as a blade, are not generated.

[0021] Next, drawing 3 shortens upstream side edge 15b of the Ayr outlet 15 of the Ayr spraying nozzle 10, and downstream side edge 16a of Ayr inlet port 16 in the same configuration with other gestalten of operation of this invention being shown and having been shown in drawing 1 (b) (b), and makes large the free passage section 17 of the Ayr outlet 15 and Ayr inlet port 16.

[0022] Although downstream side edge 15a of the Ayr outlet 15 of the Ayr spraying nozzle 10 is not deviating to the upstream when it constitutes, as shown in drawing 3 The die length of the side edges 15b and 16a of the part located in the boundary of the Ayr spraying nozzle 10 and the Ayr suction nozzle 13 is short. Since the free passage section 17 of the Ayr outlet 15 and Ayr inlet port 16 is large and Ayr 5a sprayed through the Ayr spraying nozzle 10 surroundings-lump-comes to be easy in the Ayr suction nozzle 13 Spraying Ayr 5a hardly leaks to the downstream, and the same operation effectiveness as the case of the gestalt of the above-mentioned implementation may be done so.

[0023] Subsequently, with the gestalt of further others of operation of this invention being shown, and having been shown in drawing 1 (b) (b), in the same configuration, drawing 4 turns the Ayr outlet 15 and Ayr inlet port 16 to the upstream, and arranges them, and it sprays Ayr 5a aslant and it is made to make it attract aslant.

[0024] If it constitutes as shown in drawing 4 , since Ayr 5a can be turned and sprayed on the upstream through the Ayr spraying nozzle 10, it can put back to the upstream directly from a transverse plane, therefore it can cut effectively and Ayr 5 lengthened and carried by the stencil paper 2 it runs can be attracted, even if a travel speed is Ayr 5 of the quick stencil paper 2.

[0025] In the same configuration, replace drawing 5 with using 1 set of combination of the Ayr machine of shotcrete 11 and the Ayr suction machine 14, it makes the combination of the Ayr machine of shotcrete 11 and the Ayr suction machine 14 adjoin still more nearly another gestalt of operation of this invention being shown, and having been shown in drawing 1 (b) (b) along the transit direction of stencil paper 2, and is arranged 2 sets.

[0026] If it is a configuration as shown in drawing 5 , since two steps can be covered and Ayr 5 can be continuously cut in the transit direction of stencil paper 2, it can respond to the further improvement in the speed of spreading.

[0027] Drawing 6 shows still more nearly another gestalt of operation of this invention, and it is made to carry out an air cut in what made possible two-layer coating of the color 4 for coating. By two sets of namely, the liquid supply heads 3 which separated and allotted necessary spacing to the front face of the stencil paper 2 it runs by being wound around the coater roll 1 along the stencil paper transit direction In the curtain coater which is made to flow down the color 4 for coating as curtain 4a, respectively, and has been applied To the upstream of the color flowing-down location for coating of each liquid supply head 3, the Ayr machine of shotcrete 11 and the Ayr suction machine 14 are similarly arranged with having been shown in drawing 1 (b) (b), respectively.

[0028] From each combination of 2 sets of Ayr machines of shotcrete 11 arranged along the transit direction of stencil paper 2 and the Ayr suction machine 14 being a non-contact method, if a configuration as shown in drawing 6 is adopted While being able to

cut Ayr 5 in the spreading side upstream location of the color 4 for coating down which it was made to flow from the liquid supply head 3 of the upstream Ayr 5 can be cut according to non-contact in an operation of the Ayr machine of shotcrete 11 of the downstream and the Ayr suction machine 14 on the spreading side of the color 4 for coating down which it was made to flow from the liquid supply head 3 of the upstream. For this reason, before the color 4 for coating made to apply by the upstream dries, the color 4 for coating can be finished by that downstream, and increase in efficiency can be attained from that of spreading.

[0029] Furthermore, drawing 7 shows the example of adoption to the curtain coater of another form, and lets stencil paper 2 pass between the applicator rolls 18 of the pair allotted horizontally and in parallel. In the curtain coater makes the front face of stencil paper 2 imprint the color 4 for coating down which it was made to flow in the shape of curtain 4a from a roll surface on the front face of both (or on the other hand) applicator rolls 18, and it is made to make it have applied to it from the liquid supply head 3. The combination of the Ayr machine of shotcrete 11 considered as the same configuration shown in the upstream of the color flowing-down location for coating at drawing 1 (b) (b), and the Ayr suction machine 14. The Ayr outlet 15 and the Ayr inlet port 16 of a point of each nozzles 10 and 13 approach to the front face of an applicator roll 18, and arrange in the non-contact condition.

[0030] Also when shown in drawing 7, Ayr 5 which was lengthened by the rotation of an applicator roll 18 and has been carried just before the color flowing-down location for coating can be cut by non-contact with the Ayr machine of shotcrete 11 and the Ayr suction machine 14.

[0031] In addition, as for this invention, it is needless to say that modification can be variously added within limits which do not deviate from the summary of that you may make it apply the combination of the Ayr machine of shotcrete 11 with the nozzle structure which it is not limited only to the gestalt of the above-mentioned implementation, and was shown in drawing 3 or drawing 4, and the Ayr suction machine 14 to the gestalt of operation of drawing 5, drawing 6, or drawing 7, and other this inventions.

[0032]

[Effect of the Invention] As stated above, according to the air-cut equipment of the curtain coater of this invention. In the upstream location of the flowing-down location on the front face of stencil paper of the color for coating from the above-mentioned liquid supply head in the curtain coater makes the front face of the stencil paper it runs by being wound around a coater roll flow down in the shape of a curtain, and it is made to make the color for coating have applied to it from the liquid supply head. The Ayr spraying nozzle which lengthened the Ayr outlet according to the curtain cross direction of the color for coating, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating. Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach a stencil paper front face, and it is made to fix to a non-contact condition. Consider as the configuration it enabled it to attract from the Ayr inlet port of an Ayr suction nozzle with Ayr which accompanied Ayr sprayed on the stencil paper front face from the Ayr outlet of an Ayr



spraying nozzle to stencil paper, or On the front face of the applicator roll in the curtain coater made to apply to a stencil paper front face, the color for coating down which it was made to flow in the shape of a curtain on the surface of an applicator roll Make it flow down in the shape of a curtain, and it is made to make the color for coating apply from a liquid supply head. The Ayr spraying nozzle which lengthened the Ayr outlet in the upstream location of the flowing-down location of the color for coating down which it flows on an applicator roll front face according to the curtain cross direction of the color for coating from this liquid supply head, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach on the surface of an applicator roll, and it is made to fix to a non-contact condition. Since it has considered as the configuration which enabled it to attract Ayr sprayed on the applicator roll front face from the Ayr outlet of an Ayr spraying nozzle from the Ayr inlet port of an Ayr suction nozzle with Ayr which had the front face of an applicator roll accompanied, transit of stencil paper, Ayr carried by rotation of an applicator roll towards the color flowing-down location for coating in the location in front of that It cuts by Ayr which blows off from the Ayr outlet of an Ayr spraying nozzle. It can draw in by the Ayr suction nozzle with Ayr on which cut this Ayr was able to be sprayed. Since what gives turbulence to a curtain profile by the wind of Ayr where it went together can be prevented beforehand and the Ayr outlet and Ayr inlet port are non-contact in stencil paper or a roll surface in this case, Without it seeming that a defect arises for a product by paper powder fall since paper powder is not generated like [ in the case of the blade of a contact process ] Moreover, by making the downstream side edge of the Ayr outlet of an Ayr spraying nozzle crooked to the upstream, and considering as the configuration made it Ayr blowing off made to carry out turning to the upstream Cut Ayr can be made to attract more effectively [ an Ayr suction nozzle ] than Ayr inlet port. Furthermore, the upstream side edge of the Ayr outlet of an Ayr spraying nozzle and the downstream side edge of the Ayr inlet port of an Ayr suction nozzle are made shorter than the downstream side edge of the Ayr outlet, and the upstream side edge of Ayr inlet port. By considering as the configuration which made large the free passage section of the Ayr outlet and Ayr inlet port Into an Ayr suction nozzle, it is [ Ayr sprayed through an Ayr spraying nozzle ] surroundings-lump-easy, and it can be carried out. By being able to make it draw in effectively and considering as the configuration which made the Ayr outlet of an Ayr spraying nozzle, and the Ayr inlet port of an Ayr suction nozzle slanting facing down further again so that the upstream might be turned to The effectiveness which can put back to the upstream directly, can cut effectively Ayr where it went together, and can attract it from a transverse plane and which was excellent in \*\* is demonstrated.

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#### TECHNICAL FIELD

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[Field of the Invention] This invention relates to the air-cut equipment of the curtain coater which applies the color for coating to the stencil paper manufactured in the paper mill.

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## PRIOR ART

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[Description of the Prior Art] Let paper manufactured in the paper mill be a converted paper as a product which suits the necessary purpose in many cases by not being immediately used in a form as it is, and processing it further by making it into stencil paper. Although there are various things in a converted paper, an application converted paper is in one of them. An application converted paper makes the color for coating (coating liquid) apply on the surface of paper, and is manufactured, and curtain coater is known as one of the equipment of the.

[0003] Curtain coater is wound around the coater roll 1, and it is made to make this color 4 for coating have applied directly on stencil paper 2 by making the front face of the stencil paper 2 it runs upward a little towards a lower stream of a river from this coater roll 1 flow down the color 4 for coating as coating liquid as uniform curtain 4a by the liquid supply head 3, as the outline of the example is shown in drawing 8.

[0004] Since curtain 4a of the color 4 for coating is thin, it shakes, even if few wind pressures act, and a profile is confused, a coating side gets worse, and it makes product quality deteriorate in the above-mentioned curtain coater. On the other hand, although accelerated, spreading of the color 4 for coating to stencil paper 2 front face by the above-mentioned curtain coater in recent years If run [ come ] at a high speed at which stencil paper 2 exceeds 600 m/min The wind pressure of Ayr 5 of the stencil paper (made to go together) surface layer which is lengthened by transit of this stencil paper 2 and carried sways curtain 4a of the above-mentioned color 4 for coating, and the problem of having a bad influence on a coating side comes to arise. From this, conventionally The upstream location of curtain 4a of the color 4 for coating, Above the stencil paper 2 in the upstream location of the liquid supply head 3, namely, the scraper-like blade 6 for air cuts Make it incline, and contact the front end (lower limit) on the front face of stencil paper 2, and it is arranged so that it may become facing down towards the transit direction of stencil paper 2. Ayr 5 of the stencil paper surface layer which transit of stencil paper 2 lengthens and you are made to accompany He is trying to prevent that intercept as it scratches from stencil paper 2 front face with a blade 6 in the upstream location of the flowing-down location of the color 4 for coating and drops, and the curtain profile of the color 4 for coating is disturbed by the wind pressure of above-mentioned Ayr 5 by which company is carried out.

[0005] In addition, the guide roll which allotted 7 to the downstream of the flowing-down location of the color 4 for coating, and 8 show the color pan for collecting the colors 4 for coating which flowed down from \*\*\*\* of stencil paper 2 at the time of coating.

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## EFFECT OF THE INVENTION

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[Effect of the Invention] As stated above, according to the air-cut equipment of the curtain coater of this invention In the upstream location of the flowing-down location on the front face of stencil paper of the color for coating from the above-mentioned liquid supply head in the curtain coater makes the front face of the stencil paper it runs by being wound around a coater roll flow down in the shape of a curtain, and it is made to make the color for coating have applied to it from the liquid supply head The Ayr spraying nozzle which lengthened the Ayr outlet according to the curtain cross direction of the

color for coating, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach a stencil paper front face, and it is made to fix to a non-contact condition. Consider as the configuration it enabled it to attract from the Ayr inlet port of an Ayr suction nozzle with Ayr which accompanied Ayr sprayed on the stencil paper front face from the Ayr outlet of an Ayr spraying nozzle to stencil paper, or On the front face of the applicator roll in the curtain coater made to apply to a stencil paper front face, the color for coating down which it was made to flow in the shape of a curtain on the surface of an applicator roll Make it flow down in the shape of a curtain, and it is made to make the color for coating apply from a liquid supply head. The Ayr spraying nozzle which lengthened the Ayr outlet in the upstream location of the flowing-down location of the color for coating down which it flows on an applicator roll front face according to the curtain cross direction of the color for coating from this liquid supply head, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach on the surface of an applicator roll, and it is made to fix to a non-contact condition. Since it has considered as the configuration which enabled it to attract Ayr sprayed on the applicator roll front face from the Ayr outlet of an Ayr spraying nozzle from the Ayr inlet port of an Ayr suction nozzle with Ayr which had the front face of an applicator roll accompanied, transit of stencil paper, Ayr carried by rotation of an applicator roll towards the color flowing-down location for coating in the location in front of that It cuts by Ayr which blows off from the Ayr outlet of an Ayr spraying nozzle. It can draw in by the Ayr suction nozzle with Ayr on which cut this Ayr was able to be sprayed. Since what gives turbulence to a curtain profile by the wind of Ayr where it went together can be prevented beforehand and the Ayr outlet and Ayr inlet port are non-contact in stencil paper or a roll surface in this case, Without it seeming that a defect arises for a product by paper powder fall since paper powder is not generated like [ in the case of the blade of a contact process ] Moreover, by making the downstream side edge of the Ayr outlet of an Ayr spraying nozzle crooked to the upstream, and considering as the configuration made it Ayr blowing off made to carry out turning to the upstream Cut Ayr can be made to attract more effectively [ an Ayr suction nozzle ] than Ayr inlet port. Furthermore, the upstream side edge of the Ayr outlet of an Ayr spraying nozzle and the downstream side edge of the Ayr inlet port of an Ayr suction nozzle are made shorter than the downstream side edge of the Ayr outlet, and the upstream side edge of Ayr inlet port. By considering as the configuration which made large the free passage section of the Ayr outlet and Ayr inlet port Into an Ayr suction nozzle, it is [ Ayr sprayed through an Ayr spraying nozzle ] surroundings-lump-easy, and it can be carried out. By being able to make it draw in effectively and considering as the configuration which made the Ayr outlet of an Ayr spraying nozzle, and the Ayr inlet port of an Ayr suction nozzle slanting facing down further again so that the upstream might be turned to The effectiveness which can put back to the upstream directly, can cut effectively Ayr where

it went together, and can attract it from a transverse plane and which was excellent in \*\* is demonstrated.

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## TECHNICAL PROBLEM

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[Problem(s) to be Solved by the Invention] however, by the above-mentioned conventional air-cut method Since it is what the tip of a blade 6 is contacted on the front face of stencil paper 2, and scratches Ayr 5 of the front face of stencil paper 2, In order that the paper powder which paper powder generated by friction with the stencil paper 2 and the blade 6 which carry out high-speed transit, and this paper powder deposited on the part of a blade 6, and was deposited on the part of a blade 6 may sometimes fall on stencil paper 2, the problem that a defect arises is in a product. Moreover, since a blade 6 is worn out, periodical exchange is needed.

[0007] Then, without generating paper powder, this invention tends to cut Ayr accompanied to stencil paper or a roll just before the color flowing-down location for coating, and tends to offer the air-cut equipment of curtain coater which can prevent turbulence of the curtain profile of the color for coating.

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## MEANS

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[Means for Solving the Problem] In order that this invention may solve the above-mentioned technical problem, on the front face of the stencil paper it runs by being wound around a coater roll In the upstream location of the flowing-down location on the front face of stencil paper of the color for coating from the above-mentioned liquid supply head in the curtain coater to which make it flow down in the shape of a curtain, and make it make the color for coating have applied from the liquid supply head The Ayr spraying nozzle which lengthened the Ayr outlet according to the curtain cross direction of the color for coating, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach a stencil paper front face, and it is made to fix to a non-contact condition. Consider as the configuration it enabled it to attract from the Ayr inlet port of an Ayr suction nozzle with Ayr which accompanied Ayr sprayed on the stencil paper front face from the Ayr outlet of an Ayr spraying nozzle to stencil paper, or On the front face of the applicator roll in the curtain coater made to apply to a stencil paper front face, the color for coating down which it was made to flow in the shape of a curtain on the surface of an applicator roll Make it flow down in the shape of a curtain, and it is made to make the color for coating apply from a liquid supply head. The Ayr spraying nozzle which lengthened the Ayr outlet in the upstream location of the flowing-down location of the color for coating down which it flows on an applicator roll front face according to the curtain cross direction of the color for coating from this liquid supply head, The Ayr suction nozzle which lengthened Ayr inlet port according to the curtain cross direction of the color for coating Or two or more steps are arranged. this Ayr suction nozzle serves as the upstream -- as -- arranging -- a single stage -- And the Ayr outlet of the above-

mentioned Ayr spraying nozzle is made to approach the curtain of the color for coating. Make the Ayr outlet and Ayr inlet port approach on the surface of an applicator roll, and it is made to fix to a non-contact condition. It considers as the configuration which enabled it to attract Ayr sprayed on the applicator roll front face from the Ayr outlet of an Ayr spraying nozzle from the Ayr inlet port of an Ayr suction nozzle with Ayr which had the front face of an applicator roll accompanied.

[0009] If Ayr carried with transit of stencil paper or rotation of an applicator roll reaches just before the color flowing-down location for coating, since it will be cut by Ayr sprayed through an Ayr spraying nozzle and will be drawn in through an Ayr suction nozzle with this blasting \*\*\*\* Ayr, this Ayr can prevent giving turbulence to the curtain profile of the color for coating.

[0010] Moreover, cut Ayr can be made to attract more effectively [ an Ayr suction nozzle ] than Ayr inlet port by making the downstream side edge of the Ayr outlet of an Ayr spraying nozzle crooked to the upstream, and considering as the configuration made it Ayr blowing off made to carry out turning to the upstream.

[0011] Furthermore, the upstream side edge of the Ayr outlet of an Ayr spraying nozzle and the downstream side edge of the Ayr inlet port of an Ayr suction nozzle are made shorter than the downstream side edge of the Ayr outlet, and the upstream side edge of Ayr inlet port. Into an Ayr suction nozzle, it is [ Ayr sprayed through an Ayr spraying nozzle ] surroundings-lump-easy, it can be carried out, and it can be made to draw in effectively by considering as the configuration which made large the free passage section of the Ayr outlet and Ayr inlet port.

[0012] Furthermore, by considering the Ayr outlet of an Ayr spraying nozzle, and the Ayr inlet port of an Ayr suction nozzle as the configuration which considered as slanting facing down so that the upstream might be turned to, from a transverse plane, it can put back to the upstream directly, and Ayr where it went together can be cut effectively, and can be attracted again.

[0013]

[Embodiment of the Invention] Hereafter, the gestalt of operation of this invention is explained with reference to a drawing.

[0014] Similarly drawing 1 (b) (b) with one gestalt of operation of this invention being shown and an example having been shown in drawing 8 In the curtain coater to which make it make the color 4 for coating down which the front face of the stencil paper 2 it runs by being wound around the coater roll 1 was made to flow in the shape of curtain 4a from the liquid supply head 3 have applied The Ayr machine of shotcrete 11 which becomes the duct 9 for Ayr spraying and this duct 9 for Ayr spraying which were connected to the Ayr source of supply which is not illustrated above the stencil paper 2 of the upstream rather than the flowing-down location of the above-mentioned color 4 for coating from the Ayr spraying nozzle 10 of the shape of a flat box which made free passage connection, The Ayr suction machine 14 which becomes the duct 12 for Ayr suction and this duct 12 for Ayr suction which were connected to the source of Ayr suction which is not illustrated from the Ayr suction nozzle 13 of the shape of a flat box by which free passage connection was made is installed. It is made to attract Ayr 5 where Ayr 5a sprayed on the front face of stencil paper 2 from the Ayr spraying nozzle 10 was accompanied to stencil paper 2 from the Ayr suction nozzle 13.

[0015] If it explains in full detail, the above-mentioned Ayr spraying nozzle 10 will form

the Ayr outlet 15 at a tip for a long time in the shape of a slit according to the cross direction of curtain 4a. While arranging so that this Ayr outlet 15 may be turned to the front face of stencil paper 2 in the direction of a right angle, few clearances may be held on the front face of this stencil paper 2 and it may become non-contact. The Ayr suction nozzle 13 is arranged in the upstream of this Ayr spraying nozzle 10 as the Ayr inlet port 16 at a tip touches the Ayr outlet 15 of the above-mentioned Ayr spraying nozzle 10 at least. While making Ayr inlet port 16 consistent crosswise [ of curtain 4a ] in parallel with the Ayr outlet 15 and forming in the shape of a slit. It changes into a non-contact condition towards the direction of a right angle on the front face of stencil paper 2. And the downstream wall of the above-mentioned Ayr spraying nozzle 10. It is made to be in the location of less than 30mm of upstream of curtain 4a, Ayr 5 just before reaching curtain 4a is cut by Ayr 5a sprayed from the Ayr spraying nozzle 10, and it is made to make the Ayr suction nozzle 13 draw in.

[0016] When adjustment to multistage was enabled so that the Ayr suction force of the above-mentioned Ayr suction nozzle 13 might have the capacity to attract Ayr 5a sprayed from the Ayr spraying nozzle 10 and it could respond to change of the amount of Ayr by the travel speed of stencil paper 2, for example, the amount of suction is set to Q1 and the amount of spraying is set to Q2, it is made to have used as about  $Q1 \geq 1.5Q2$ .

[0017] Moreover, although the structure which is open for free passage in the whole paper width direction is sufficient as the above-mentioned Ayr spraying nozzle 10, as an example is shown in drawing 2, it is good also as structure where the interior is divided into the paper width direction necessary spacing by dashboard 10a for distribution. It was made to be prolonged from the duct 9 for Ayr spraying to the location before the Ayr outlet 15.

[0018] Ayr 5 of the stencil paper surface layer lengthened and carried by the stencil paper 2 it runs at the time of operation of curtain coater. If the flowing-down location of the color 4 for coating tends to be approached and it is going to pass through the location of the Ayr outlet 15 of the Ayr spraying nozzle 10, and the Ayr inlet port 16 of the Ayr suction nozzle 13. The layer of Ayr 5 by which company was carried out [ above-mentioned ] will be broken from the duct 9 for Ayr spraying by Ayr 5a sprayed from the Ayr outlet 15 through the Ayr spraying nozzle 10. An air cut will be carried out and cut so-called Ayr 5 will be further attracted through the Ayr suction nozzle 13 by the duct 12 for Ayr suction with sprayed Ayr 5a. Therefore, the wind of Ayr 5 where it went together can prevent turbulence of a curtain profile in curtain 4a of the color 4 for coating.

[0019] Ayr 5 cut since turning was carried out so that Ayr which will be sprayed from Ayr outlet 15 of this Ayr spraying nozzle 10 if it is made configuration which, as for Ayr outlet 15 which faces curtain side of Ayr spraying nozzle 10 in the above, downstream side edge 15a covers overall length to the upstream, and inclines 5a might turn to the upstream can be made to attract more effectively [ the Ayr suction nozzle 13 ] than Ayr inlet port 16. Company of new Ayr which is the downstream of the Ayr outlet 15 of the Ayr spraying nozzle 10, and gives turbulence to a curtain profile seems moreover, not to generate it, since the Ayr outlet 15 of the Ayr spraying nozzle 10 is arranged in the location of less than 30mm of near sides of the spreading location used as the location down which curtain 4a of the color 4 for coating flows.

[0020] Thus, since it is made to make Ayr 5 where it went together while spraying Ayr 5a attract, stencil paper 2 sticks fast, there is no \*\*, and since Ayr 5 where it goes together

can be cut by the non-contact method, paper powder is not generated at the time of an air cut, and articles of consumption, such as a blade, are not generated.

[0021] Next, drawing 3 shortens upstream side edge 15b of the Ayr outlet 15 of the Ayr spraying nozzle 10, and downstream side edge 16a of Ayr inlet port 16 in the same configuration with other gestalten of operation of this invention being shown and having been shown in drawing 1 (b) (b), and makes large the free passage section 17 of the Ayr outlet 15 and Ayr inlet port 16.

[0022] Although downstream side edge 15a of the Ayr outlet 15 of the Ayr spraying nozzle 10 is not deviating to the upstream when it constitutes, as shown in drawing 3 The die length of the side edges 15b and 16a of the part located in the boundary of the Ayr spraying nozzle 10 and the Ayr suction nozzle 13 is short. Since the free passage section 17 of the Ayr outlet 15 and Ayr inlet port 16 is large and Ayr 5a sprayed through the Ayr spraying nozzle 10 surroundings-lump-comes to be easy in the Ayr suction nozzle 13 Spraying Ayr 5a hardly leaks to the downstream, and the same operation effectiveness as the case of the gestalt of the above-mentioned implementation may be done so.

[0023] Subsequently, with the gestalt of further others of operation of this invention being shown, and having been shown in drawing 1 (b) (b), in the same configuration, drawing 4 turns the Ayr outlet 15 and Ayr inlet port 16 to the upstream, and arranges them, and it sprays Ayr 5a aslant and it is made to make it attract aslant.

[0024] If it constitutes as shown in drawing 4 , since Ayr 5a can be turned and sprayed on the upstream through the Ayr spraying nozzle 10, it can put back to the upstream directly from a transverse plane, therefore it can cut effectively and Ayr 5 lengthened and carried by the stencil paper 2 it runs can be attracted, even if a travel speed is Ayr 5 of the quick stencil paper 2.

[0025] In the same configuration, replace drawing 5 with using 1 set of combination of the Ayr machine of shotcrete 11 and the Ayr suction machine 14, it makes the combination of the Ayr machine of shotcrete 11 and the Ayr suction machine 14 adjoin still more nearly another gestalt of operation of this invention being shown, and having been shown in drawing 1 (b) (b) along the transit direction of stencil paper 2, and is arranged 2 sets.

[0026] If it is a configuration as shown in drawing 5 , since two steps can be covered and Ayr 5 can be continuously cut in the transit direction of stencil paper 2, it can respond to the further improvement in the speed of spreading.

[0027] Drawing 6 shows still more nearly another gestalt of operation of this invention, and it is made to carry out an air cut in what made possible two-layer coating of the color 4 for coating. By two sets of namely, the liquid supply heads 3 which separated and allotted necessary spacing to the front face of the stencil paper 2 it runs by being wound around the coater roll 1 along the stencil paper transit direction In the curtain coater which is made to flow down the color 4 for coating as curtain 4a, respectively, and has been applied To the upstream of the color flowing-down location for coating of each liquid supply head 3, the Ayr machine of shotcrete 11 and the Ayr suction machine 14 are similarly arranged with having been shown in drawing 1 (b) (b), respectively.

[0028] From each combination of 2 sets of Ayr machines of shotcrete 11 arranged along the transit direction of stencil paper 2 and the Ayr suction machine 14 being a non-contact method, if a configuration as shown in drawing 6 is adopted While being able to cut Ayr 5 in the spreading side upstream location of the color 4 for coating down which it

was made to flow from the liquid supply head 3 of the upstream Ayr 5 can be cut according to non-contact in an operation of the Ayr machine of shotcrete 11 of the downstream and the Ayr suction machine 14 on the spreading side of the color 4 for coating down which it was made to flow from the liquid supply head 3 of the upstream. For this reason, before the color 4 for coating made to apply by the upstream dries, the color 4 for coating can be finished by that downstream, and increase in efficiency can be attained from that of spreading.

[0029] Furthermore, drawing 7 shows the example of adoption to the curtain coater of another form, and lets stencil paper 2 pass between the applicator rolls 18 of the pair allotted horizontally and in parallel. In the curtain coater makes the front face of stencil paper 2 imprint the color 4 for coating down which it was made to flow in the shape of curtain 4a from a roll surface on the front face of both (or on the other hand) applicator rolls 18, and it is made to make it have applied to it from the liquid supply head 3 The combination of the Ayr machine of shotcrete 11 considered as the same configuration shown in the upstream of the color flowing-down location for coating at drawing 1 (b) (b), and the Ayr suction machine 14 The Ayr outlet 15 and the Ayr inlet port 16 of a point of each nozzles 10 and 13 approach to the front face of an applicator roll 18, and arrange in the non-contact condition.

[0030] Also when shown in drawing 7 , Ayr 5 which was lengthened by the rotation of an applicator roll 18 and has been carried just before the color flowing-down location for coating can be cut by non-contact with the Ayr machine of shotcrete 11 and the Ayr suction machine 14.

[0031] In addition, as for this invention, it is needless to say that modification can be variously added within limits which do not deviate from the summary of that you may make it apply the combination of the Ayr machine of shotcrete 11 with the nozzle structure which it is not limited only to the gestalt of the above-mentioned implementation, and was shown in drawing 3 or drawing 4 , and the Ayr suction machine 14 to the gestalt of operation of drawing 5 , drawing 6 , or drawing 7 , and other this inventions.

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## DESCRIPTION OF DRAWINGS

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[Brief Description of the Drawings]

[Drawing 1] One gestalt of operation of the air-cut equipment of the curtain coater of this invention is shown, (b) is the whole schematic diagram and (b) is the enlarged drawing of an important section.

[Drawing 2] It is the perspective view of the Ayr spraying nozzle seen from [ of drawing 1 (b) ] A.

[Drawing 3] It is the partial diagrammatic view showing other gestalten of operation of this invention.

[Drawing 4] It is the partial diagrammatic view showing the gestalt of further others of operation of this invention.

[Drawing 5] It is the schematic diagram showing still more nearly another gestalt of operation of this invention.

[Drawing 6] It is the schematic diagram showing still more nearly another gestalt of operation of this invention.



**[Drawing 8]** It is the schematic diagram showing an example of curtain coater.

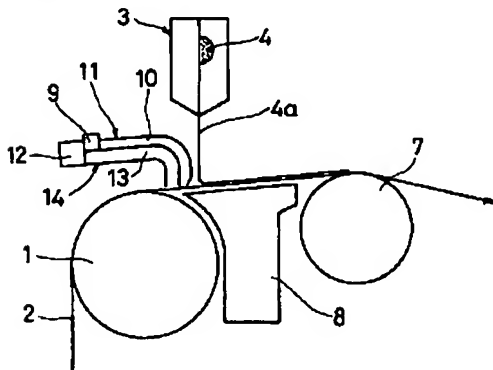
[Description of Notations]

- 1 Coater Roll
- 2 Stencil Paper
- 3 Liquid Supply Head
- 4 Curtain for Coating
- 4a Curtain
- 10 Ayr Spraying Nozzle
- 11 Ayr Machine of Shotcrete
- 13 Ayr Suction Nozzle
- 14 Ayr Suction Machine
- 15 Ayr Outlet
- 15a Downstream side edge
- 15b Upstream side edge
- 16 Ayr Inlet Port
- 16a Downstream side edge
- 17 Free Passage Section
- 18 Applicator Roll

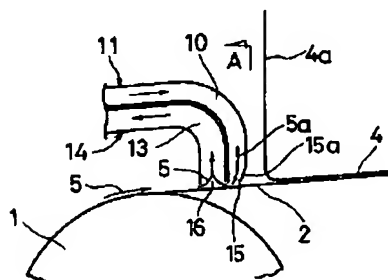
## DRAWINGS

[Drawing 1]

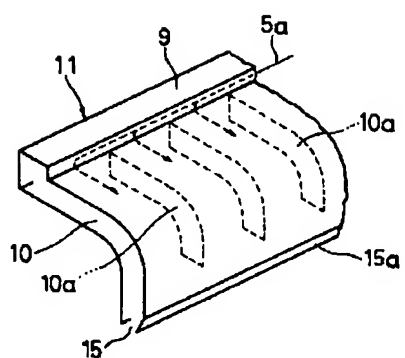
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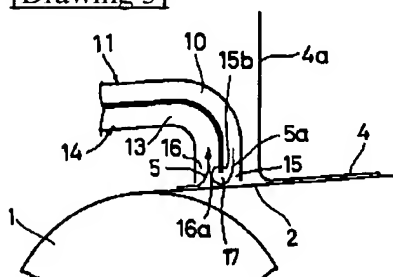
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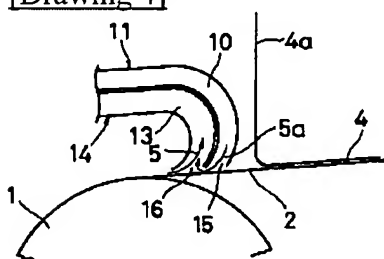
[Drawing 2]



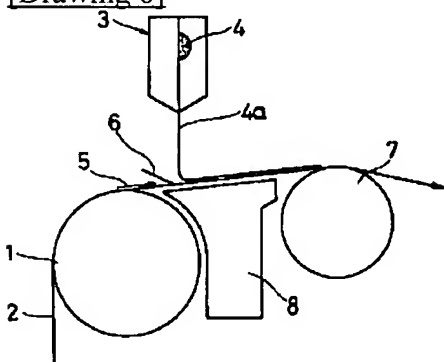
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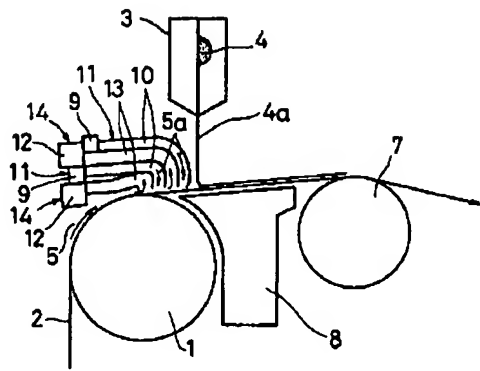
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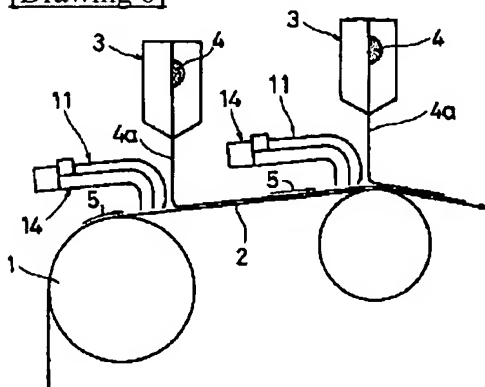
[Drawing 8]



[Drawing 5]



[Drawing 6]



[Drawing 7]

